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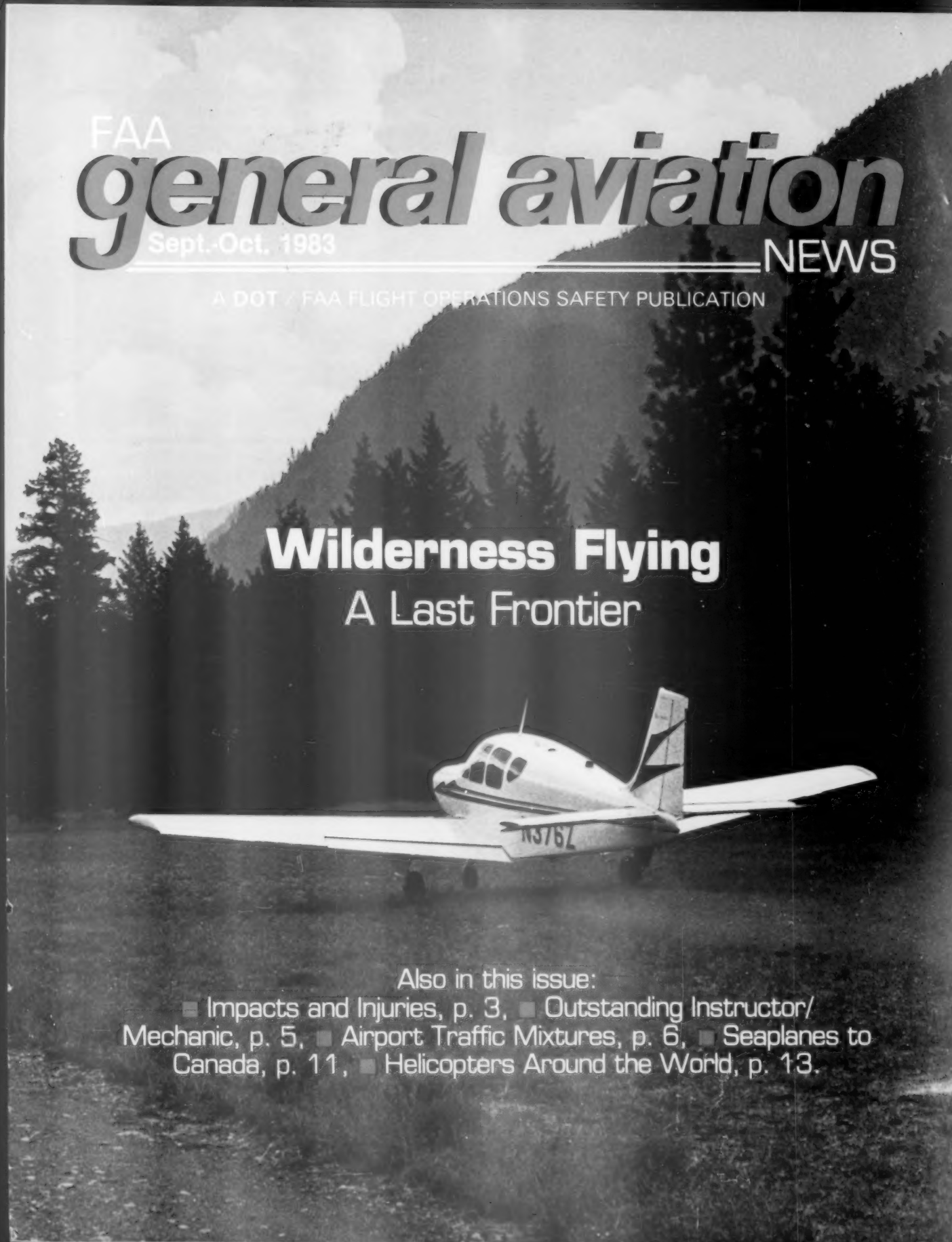

Wilderness Flying
A Last Frontier

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BRIEFS

SLICK DEALS. Advertisements have appeared recently offering rebuilt Slick 4000 magnetoes on a trade-in basis at bargain rates—don't be tempted. The 4000 series are sealed at the factory and are not designed to be opened and serviced in the field. In fact, there are no replacement parts or even instructions for overhaul. Once it's gone, it's gone. The magneto with a broken seal is a candidate for the junkheap.

NO FOILING. The mystery of how pieces of thick aluminum foil ended up in the oil sumps of several different aircraft during recent inspections has been cleared up. Some oil manufacturers now distribute their aviation oil in plastic quart containers with built-in spouts. Before the oil can be poured, an aluminum foil seal (which keeps out contaminants) has to be removed. Some pilots and mechanics, however, are just puncturing the seal or peeling it only partly off, allowing pieces of the seal or the entire seal to be poured into the engine with the oil. No reports of engine stoppage or damage have been noted—yet. To prevent that unpleasant possibility, make sure you peel the seal off and throw it away.

AIR CARRIER FLEET MUSHROOMING. Aircraft production overall in 1982 was only about half that of 1981—5,684 units. But significantly the air carrier fleet in 1982 showed the highest total ever, 4,074 aircraft, an increase of 101 over 1981—due mostly to acquisition of turboprop aircraft by small commuter airlines following air carrier deregulation in 1979. The number of air carrier certificates has more than doubled since then.

BIG BANG. A pilot's preparation for a leisurely balloon flight became a frantic escape from a raging fire when the valve stem from the vapor pilot light on the propane tank came out, resulting in a gas leak. Accidental ignition destroyed the balloon, burner and basket; and the pilot suffered burn injuries. The packing nut on the valve stem had loosened gradually in normal use, eventually releasing the stem. A service letter has been issued to owners by the manufacturer (Raven Service Bulletin #114). This should be carefully studied before further flight. Other balloon owners should discuss this type of mechanical failure with a certificated mechanic or their manufacturer's representative.

Impacts and Injuries

"Every body persists in its state of uniform motion unless it is compelled to change that state by forces impressed upon it."
–Sir Isaac Newton

"Humpty Dumpty sat on a wall.
Humpty Dumpty had a great fall.
All the king's horses and all the king's men
Couldn't put Humpty together again."
– Anonymous

What idea the unknown contributor to Mother Goose Tales and the father of modern physics could possibly have shared, and what bearing it may have on aviation may escape us at first. But the homely quotation can be said to illustrate the scientific law: the forces that arrest a free-falling object will alter its shape—perhaps irreversibly.

However, if Humpty were to be surrounded by and restrained within an energy-absorbing shell, he might be spared the shape-altering effect of his carelessness.

This line of thinking is behind the concept of "crashworthiness" in aircraft design, and this is the central focus of a recent FAA summary report on occupant survival in general aviation accidents. The report, prepared by FAA's Civil Aeromedical Institute (CAMI) at Oklahoma City, suggests that about one-third of the approximately 1,500 general aviation accident fatalitites suffered annually could be prevented by improved design, plus pilot awareness and utilization of the options open to him.

The report cites two key means of minimizing the harmful effects of rapid deceleration: *energy absorption* (progressive collapsing of the structure), and *effective occupant restraints*. An aircraft is considered "crashworthy" if its design provides for holding occupants within a "cocoon" (the cabin) which is surrounded on all sides by materials or structures that will fold in like an accordion on impact.

The concept of "crashworthiness," first published in a Cornell University study of 1949, was the basis for a new design for agricultural aircraft. In the immediate post-World War II period, there was a surplus both of pilots looking for work and of aircraft that could be acquired cheaply. Crop dusting and associated agricultural flying was one answer for both surpluses. However, accident rates for this type of flying soared, and the fatality and serious injury rate was appalling.

Following the Cornell study a prototype aircraft, especially dsigned for agricultural work and called AG-1, was built in 1950 at Texas A&M University.

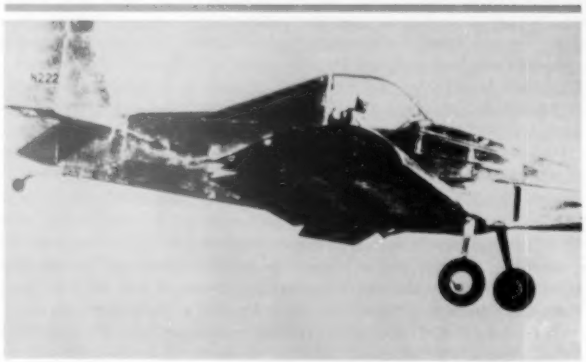
Cornell's recommendations included:

1. a strong but less rigid outer cockpit or cabin to encase the occupant,
2. a hopper between pilot and engine to absorb impact forces and keep the engine from crushing the pilot on nose-down impact,
3. a low-positioned instrument panel which the pilot's head would not strike,
4. a hollow roll of thin, energy-absorbing aluminum above the instrument panel which would dissipate impact if the pilot's head struck it,
5. a crash helmet to further protect the pilot's head,
6. the elimination of protruding knobs or handles or other rigid structures upon which the pilot might be impaled during the rapid deceleration of a crash,
7. a proper body restraint system consisting of a lap belt and shoulder harness,
8. an energy-absorbing seat to keep the pilot immobile on impact and protected from vertical forces.

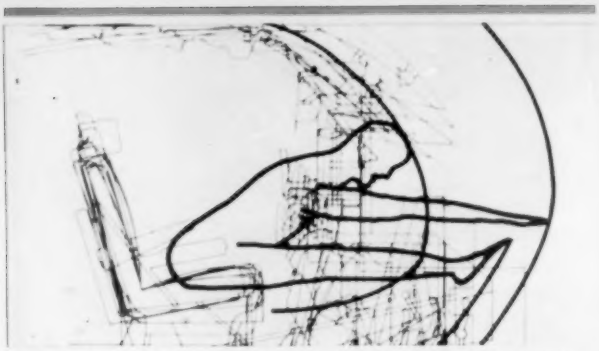
Although never actually operated by an agricultural operator, the AG-1 was successfully demonstrated around the country for several years and found eminently suitable for ag work as regards visiblity, maneuverability, etc. Ironically, the AG-1 inadvertently provided the most dramatic proof of its crashworthiness when it was substantially damaged, following impact with a power pole in a farm field and an inverted crash. Remarkably, the pilot emerged unscratched; the crashworthiness features spared him injury in what would normally have been a fatal accident. Manufacturers' eyes were opened, resulting in a new generation of specially designed agricultural aircraft, whose names have become household words in the industry: The Cessna *AgTruck* and *Husky*, the Piper *Pawnee*, the *Air Tractor*, the Grumman-Schweizer *Ag-Cat*, and so on.

Indeed, the entire general aviation aircraft fleet benefited from incorporation of many of these design modifications, plus the use of newly developed strong but lightweight materials. With improved safety design factors, the general aviation accident and fatality rate has continued to decline over the past two decades. Although the ag operation total accident rate is still higher than the rest of general aviation (11.99 per 100,000 hours compared to 8.2 respectively), the fatal accident rate has shrunk to less than one ag accident per 100,000 hours compared to 1.5 for the rest of general aviation.

There are, however, many older aircraft—including wooden-fuselage



The prototype aircraft AG-1, an early crashworthy design.



Curved lines show upper body movement with seatbelt only.

Shoulder harness/seatbelt allows much less mobility.

and fabric-covered aircraft—still in use which do not have the advantage of modern crashworthiness technology and which certainly seem vulnerable by today's standards although their virtues are still stoutly defended in some quarters. How safe are these planes? There are four principles of crashworthiness that may help pilots answer this question for their own purposes.

COCKPIT INTEGRITY

Aircraft occupants should be lodged in a cockpit or cabin that is strong enough to retain its integrity on impact but flexible enough to cushion impact forces. The structural members of an aircraft which accomplish this lifesaving feat may not be visible to the naked eye. A mechanic or dealer will be able to explain which type of fuselage (truss or monocoque or semi-monocoque) a particular make and model has and the advantages of each. Truss fuselages, a common feature of older airplanes, are usually a framework of crossbraced ribs or welded tubing, rigid and covered with fabric. Considerable strength is derived from the framework's rigidity to withstand inflight turbulence, but impact with the ground may result in fracturing and penetration of the cockpit as well as direct transmission of impact forces to occupants.

The monocoque design, common in today's general aviation and air carrier aircraft, depends on the strength of a metal skin rather than framework. A monocoque fuselage uses formers (circles of metal), some framework, and bulkheads to shape the fuselage with the skin carrying the primary stresses and loads. There are no braces, so the skin must be strong and yet lightweight and also pliable to "give way" on impact. Aluminum and lightweight alloys made the monocoque fuselage possible and contribute to its crashworthiness. One variation of the monocoque fuselage is the "semi-monocoque" which adds stringers (aluminum or alloy rods, attached to the formers and bulkheads) running the length of the fuselage.

IMMOBILITY

An aircraft can be abruptly decelerated in one of three ways. When there is no forward motion, as in a flat spin, the aircraft impacts with a *vertical* force that jams the occupants downward into their seats or against the flooring, often causing compression injuries to the spine and neck if the occupant's body movement is accelerated by insufficient restraint.

When an aircraft's *forward* motion is stopped by collision with an object, improperly restrained pilots and passengers will continue in motion along the same direction until stopped by the control yoke, instrument panel, windshield, or seatback, if a rear passenger. Cranial, facial, and torso injuries may result.

Aircraft usually crash in a combination of forward and downward motions, described as *vector*. Occupants generally will be decelerated in a vertical direction (feet to head) but with some forward motion as well. In this situation, without proper restraints the occupants are particularly vulnerable to injury from sharp or protruding levers, knobs, handles, etc.

Pilots and passengers should be held as immobile in their seats as possible to keep them from flailing about and suffering injuries on the initial and secondary impacts which may occur during an accident. Seatbelts alone provide some protection, but without a shoulder harness, the upper portion of the body will still be thrown forward with a whip-like motion and grievous effect. Accident investigators have found victims lapbelted in place but fatally hurt when they suffered head injuries from striking the instrument panel, or chest injuries from the control yoke.

In December 1980 two couples departed Denver, CO in a Piper *Commanche* for a ski holiday in Aspen. Shortly after takeoff the aircraft was caught in a downdraft and struck the side of a 9,000′ mountain in the Sawatch Range. The damage to the aircraft was severe, but the accident was classified "survivable," based on the slight injuries of the two rearseat passengers (broken arms) and the fact the pilot survived essentially unhurt. However, the seatbelted fourth occupant, not wearing a shoulder harness and seated in the right front seat, was killed when he jackknifed forward on impact and was impaled on the control yoke.

The "inertial reel" shoulder harness, fairly standard in aircraft cockpits (and in cars) now, allows one to play out sufficient harness to move about comfortably; but on impact the force of deceleration causes the reel to lock and the harness to hold the person upright and in place. This feature should dispel most of the concerns voiced against the "restrictions" of harness restraints. A *double-strap* harness is preferred over the single diagonal strap, since it distributes the force more evenly over a larger portion of the chest, helping to minimize bruises or other belt-related injuries. In some aircraft there is also the advantage of an additional attach point, to distribute the strain on the attachments.

Small civil airplanes manufactured after July 18, 1978, must have - *safety belts for all occupants and approved shoulder harnesses for each front seat.* (Aircraft manufactured prior to that time require only safety belts for all occupants who have reached their second birthday.) Some aircraft designs provide for shoulder harnesses at passenger seats as well as a safety option. Older aircraft may have had shoulder harnesses retrofitted.

The Federal Aviation Regulations address the use of safety belts and shoulder harnesses in two places. Part 91.7 states that *required flight crew members* must keep their shoulder harnesses fastened during takeoff and landing and the safety belts fastened at all times while at their duty stations. (The only exceptions are when shoulder harnesses are not installed, or if wearing the harness keeps the crewmember from performing required cockpit duties.) The use of safety belts by general aviation passengers is in Part 91.14, which requires the pilot in command both to *notify passengers to fasten the lapbelt for takeoff and landing and to ensure that each passenger knows how to fasten and unfasten it.* Shoulder harnesses may sometimes be installed at passenger seats, and although the FARs do not require them to be worn, the pilot might exercise a personal requirement for their use by passengers.

RESTRAINT SYSTEM ATTACHMENT

The belts and straps immobilizing occupants should be attached to the strongest part of the airframe so that attachments will not break away on impact and allow the pilot or passengers to tumble about uncontrolled. Accident investigators have found crash victims with serious or fatal injuries because of seatbelts or shoulder harnesses that tore away, either from deterioration of the attachment or because the restraint was not attached to an integral structural member. For your own peace of mind, have a mechanic, preferably one familiar with your make and model aircraft, inspect your seatbelts and shoulder harnesses to determine how

strong the attach points are. (In some aircraft alternate attachments are possible.) The weakest link of some restraints are sometimes the attach points.

For example, in 1981 a passenger received fatal injuries in a *Cherokee*, during an emergency landing in a farm field in Kansas, after an engine failure. The pilot was seriously injured when the aircraft struck a rut and flipped over but survived and subsequently recovered. The damage to the aircraft was substantial, but the accident was considered survivable. Both persons were wearing seatbelts and shoulder harnesses—so what happened? The inertial reel shoulder harnesses were attached to the cabin sidewalls (not to the fuselage itself). The walls shattered in the crash.

As part of your preflight inspection, whether for your own aircraft or a rental, check also for attach point deformations, missing bolts, elongated bolt holes, frayed straps, etc. See FAA Advisory Circular 43.13-2A.

INTERIOR CUSHIONING

The cabin and cockpit interior should also be cushioned in some manner to minimize human injury if an occupant happens to strike a nearby surface. This is the purpose of the roll of aluminum in ag aircraft and the energy-absorbing padding on other aircraft and on automobile dashboards. Here again a certified airframe mechanic can assist you in evaluating the crashworthiness characteristics of the aircraft's interior and perhaps in improving the situation. Padded coamings, walls, and seatbacks and installation of headrests help protect survivors from serious injury. These are factors to be considered when buying or renting any airplane. In some cases the owner can arrange for modifications by an appropriately qualified mechanic.

If possible, the seats themselves should be on supports made of a pliable metal that will flex to absorb downward forces on impact. Cast metal seat supports (which can be identified by your mechanic) tend to break away under lateral load forces and have virtually no flex. Crash survivability also dictates that seats should not be designed for installation over rigid portions of the fuselage, such as a low-wing spar. The spar, necessarily stronger than the rest of the fuselage, will not give in a crash, and an occupant of a seat over one will be jammed down upon it in a crash with sharp vertical motion, with the possibility of serious, even fatal spinal injuries.

Since seats are retained on track by rollers which allow their position to be adjusted, their integrity is especially important when the restraints are attached to the seat structure. The angle irons that retain the seat rollers on their track are subject to wear with use. Their condition is checked at the annual inspection, but more frequent evaluation may be desireable. See the article on p. 5 concerning one mechanic's contribution to flight safety.

A word about backward and side-facing seats. Many six-place general aviation aircraft now employ "club" seating and some of the larger aircraft have side-facing bench seats. In an accident with forward motion, the side-facing seat occupant will decelerate in what to him or her is a lateral direction. Many of these seats have no accompanying shoulder harness, and the sideways force on the safety belt sometimes tends to make it ride up over the pelvis, compressing internal organs in the abdomen and chest. Additional protection may be available from approved harnesses.

In an aft-facing seat, the occupant decelerates to his or her rear, which could overload the strength of the seatback and result in fatal neck injuries if the seatback is not specially designed for this purpose—in accordance with certification. Be careful about unapproved substitutions.

Beyond the manufacturer's regulatory obligation to build a crashworthy aircraft and the mechanic's responsibility to help keep it that way, the duties of pilot in command include assuring the status and use of restraints, perhaps even above and beyond what the regulations require. *Due care* is a legal concept that casts a very long shadow.

Remember what all the king's horses and all the king's men could not do. ■

NOTE: This article was based in part on a recent CAMI summary report entitled "Crashworthiness: An Illustrated Commentary on Occupant Survival in General Aviation Accidents," by William R. Kirkham, S. Marlene Wicks, and Donald Lee Lowrey. The report (FAA-AM-83-8) is available through the National Technical Information Service, Springfield, Virginia, 22161. Contact them for price information.

The Lady Who Would Not Quit, The Mechanic Who Really Cared. . .

A Kansas pilot whose love of flying helped her overcome crippling injuries has been named 1983 Flight Instructor of the Year by a joint FAA-industry panel of judges. And a corporate chief of maintenance with a keen eye for spotting trouble before it happens was accorded similar honors as Aviation Maintenance Technician of the Year. Chief instructor Mary Joan Reindl and maintenance chief Harry P. Cleis were selected from thousands of entries from all over the country.

Mrs. Reindl, of Leavenworth, KS, took up flying in 1965 to share her husband's weekend interests. A few bad experiences with bumpy air in her first lessons almost dissuaded her, but after taking a part-time job at the local airport, she became determined to master the art of flying. In 1968 she became an instructor and in subsequent years competed in Powder Puff Derbies, became an accident prevention counsellor, formed an aero club noted for its safety seminars and educational clinics, and received numerous commendations for her safety work.

Then in January 1974 her right leg was crushed in an automobile accident on icy roads. The emergency room prognosis was that she would never walk again, much less fly. The thought of never being able to fly again was even more unacceptable to her than not being able to walk, and she simply refused to allow it to enter her mind.

From her hospital bed, while recuperating and undergoing physical therapy, she continued to organize pilot seminars and ground schools and counsel students and other pilots who came to her bedside. Less than a year after the accident she was not only walking but was back in the air instructing at the Kansas City Aviation Center.

The 1983 maintenance award winner, Harry P. Cleis of Pittsburgh, PA, has been Chief of Maintenance of a corporate fleet for the past ten years and his alert trouble-shooting has earned him the admiration of company pilots. The Technician of the Year Award is the latest in a long line of recognitions for his work.

It was a "small problem" with the *Westwind* (a twin turbo business jet built in Israel) that first brought Cleis to the attention of manufacturers as a valuable critic of their product. He noted during routine inspection that the gap separating the angle irons that hold the crew's seat rollers on track tended to increase ever so slightly with wear. A gap excess as small as .01 inches, in his opinion could enable the seats to leave the track under the stress of a landing accident, and the shims provided for adjustment did not appear to solve the problem. Since the crew's restraint system was connected only to the seats, he could forsee serious consequences in the event of an accident or hard landing which dislodged the seats from their tracks.

His concern stemmed from his study of the seat failure in the jet landing accident which the noted baseball player Thurman Munson had failed to survive. ". . . We have the potential of a minor accident turning into a serious injury." Cleis wrote to the manufacturer, providing detailed diagrams of what he considered to be the crux of the problem. Subsequently all owners of the pertinent *Westwind* models were alerted to the potential hazard by means of a Manufacturer's Service Bulletin.

Cleis continued to forward suggestions to the airplane manufacturer on other design weaknesses he had become aware of, including the lack of adjustment capability on thrust reversers switches, the need for a more effective landing light lens, and the weakness in a nose gear cable. *Westwind* passed on his comments and drawings to their technical service department and encouraged Cleis to continue his "watchdog" role.

Mrs. Reindl and Mr. Cleis are to receive cash awards and prizes worth about $5,000 each, from aviation industry representatives, and distinctive award plaques from the FAA, at a jointly sponsored luncheon October 27 in Washington, DC. ■

AIRPORT TRAFFIC MIXTURES

Ultralight flightparks may be the ultimate solution

In the Beginning, the appeal of ultralight flying vehicles was largely in the sense of freedom they offered the adventurers among us who wanted to get right away from the clutterings of society, including busy airports full of traffic restrictions. With an ultralight, you could take off and land free as a bird just about wherever you wanted, the more remote the better.

But as the numbers of this latest wave of flying machines and their users proliferated, there has been an increasing ultralight usage of established airports—for fuel, storage, repairs, restaurants, communications, or simply convenience. This movement into the "mainstream" of aviation has raised some serious questions among airport managers and pilots of conventional airports:

Is an ultralight—flown in many cases by an uncertificated, uninsured pilot who is unrestricted by any requirements as regards age, training, state of health, communications capability, familiarity with airport operational procedures, etc.—moving at speeds usually much less than half of those of the slowest aircraft, an unsafe intrusion in an environment where given standards for aircraft performance and pilot proficiency have normally prevailed? On the other hand, can an ultralight be legitimately denied access to a public use airfield?

The advisability of mixing conventional and ultralight traffic has to be answered on a case by case basis. However, the question of accessibility is a fairly straightforward matter. FAA regulations, (FAR 103.17) prohibit ultralights operating under FAR 103 from penetrating certain airspace surrounding airports (terminal control areas, control zones, airport traffic areas) without prior approval from Air Traffic Control.

Otherwise, unless an airport is supported by Federal funds, the decision to admit ultralights is entirely up to the individual airport authority. Since there are over 5,000 public use airports without control towers in the United States, there may be nearly that many different attitudes toward ultralight acceptance. Ultimately FAA's sectional charts may contain an official indication of where ultralight activity may be expected (as is currently done with sky diving drop zones at airports), but for the present each ultralight operator must ascertain that information for him or herself.

NOISE-PROTECTED AREAS

Ultralight operators should be aware that the restrictions to flight, for pilots of aircraft, over National Primitive Areas, Wildlife Refuges, National Parks, and other noise sensitive areas apply to them as well. Except in an emergency, flying machines may not land without authorization in federally or locally protected areas. Furthermore, ultralights (and aircraft) are requested to maintain an overflight altitude of 2,000′ AGL or higher over these areas which are depicted on sectional charts. Although ultralights have a small engine, their ability to fly lower and slower than aircraft may create a harmful disturbance.

The management of any non-federally supported airport—as long as they are in compliance with state and local ordinances—may issue an outright ban on ultralight operations, for safety considerations or any considerations whatever. They may welcome ultralights during certain hours of certain days. Or a landing area nearby but distinct from the aircraft runways may be set aside for ultralights (as is sometimes done for gliders or balloonists).

FAA does require that *Federally funded* airports accommodate ultralights as a recognized "aeronautical activity," but only if this can be done without hazard to aircraft. Note that the determination of the safety aspect is initially the responsibility of the airport management; FAA will intervene only if the issue is disputed. The term "accommodate" means that, if possible, some provision should be made for the operations of ultralights on or near the airport, in an established or separate pattern, or from a separate runway.

The options are numerous, and the affected airport operators (about 1,000 nationwide) will usually make a good effort to include ultralight activity. The decision to exclude them is rarely an arbitrary one. Management takes into account the kind of traffic, the proximity of congested areas, residents' sensitivity to noise from low-flying, lightly muffled engines, early morning activity, etc. Policies will vary from township to township and county to county, so if you plan some extensive crosscountry hopping,

check before you go. By telephone is the best bet, although some airports might include a comment on ultralight policy in their *Airport/Facility Directory* entry.

Noise complaints from vociferous airport neighbors seeking to ban ultralight activity or severely restrict airport operating hours are only one of the concerns of airport managers. Some airplane operators are also critical, complaining that ultralights frequently do not give way to aircraft, as required by regulations; that they are often flown by irresponsible "children;" and that they have caused near or actual midair collisions. FAA is monitoring ultralight operations to determine if the complaints are valid.

Ultralight operators, on the other hand, are not always happy in the airport environment either. Knowledgeable flyers are concerned about the dangers of upset from wake turbulence (from even small aircraft if they pass by too close when overtaking). Activity on the ramp can also get pretty busy at times, with prop blasts from powerful airplanes rocking the wings of the wind-sensitive ultralights. And operations at some non-controlled single-runway airports can get pretty hectic on a busy weekend for the radio-less pilot.

What are the alternatives, then, for ultralight operators who find themselves shut out of the local airport or who wish to go elsewhere? *Abandoned* airports might prove one answer. State aeronautical agencies will know of such airports (preferably rurally based to avoid congested areas) and can help determine which authority could grant use permission. A word of caution, though: re-opening a long-abandoned strip might take some work before it is safe to use. Check it out from the ground before flying in, to make sure it is free of potholes, animal burrows, powerlines, or other such hazards to landing.

Since one of the ultralight's selling features is its ability to operate to and from small areas, open fields in the country are ideal, provided again that operators do not stray over dwellings at low altitude. A check for hidden hazards is always in order, as is prior permission from the owner. An angry farmer just might not "take too kindly" to your visit if it upsets his bossies. However, in many such out-of-the-way places ultralight operations are a welcome diversion, especially to the young at heart.

A third alternative would be to establish an ultralight "flight park" at a suitable location. (It is called a flightpark because conventional aircraft will not be using it.) It may not be so simple as obtaining title to a patch of ground and saying, "That's my ultralight flightpark." Not only Federal but state and local requirements may have to be met, and taxes may have to be paid, or improvements made before the first ultralight can set down.

For example, if a site is going to be used for 30 or more consecutive days with more than 10 takeoffs and landings per day, then FAA Form 7480-1 (Notice of Construction, Alteration, Activation, and Deactivation of Airports) must be submitted before operations can commence. The form is available from any FAA Airports Field Office, which will also provide any additional advice or guidance required. Some states and localities may have further requirements or conditions. In fact, at last count some 35 states required licensing of ultralight flight parks by the state aeronautical agency before these could be activated.

There are no FAA standards for flightparks, but useful information from the several ultralight organizations is available; and certain standards in use at conventional airports may be applicable. FAA's local airports field offices will also be glad to help.

Until such time as sufficient ultralight parks are available, a judicious behavior on the part of ultralight flyers will earn them a welcome at many small, uncrowded airports. Just remember that sighting a likely looking runway from the air is not a license to "drop in." Someone has labored to build and maintain that runway, and that someone's permission to land has to be sought and obtained. A small, lightweight portable radio with UNICOM frequencies is a big help.

This word of caution goes double for operations at the many private or restricted airports, where uninvited pilots (certificated or not) can be held liable for trespass. ■

(For additional information on ultralights and airports, send for the free advisory circular 103-6, "Ultralight Vehicle Operations—Airports, Air Traffic Control, and Weather," from DOT Publications Branch, M-442.32, Washington, DC, 20590.)

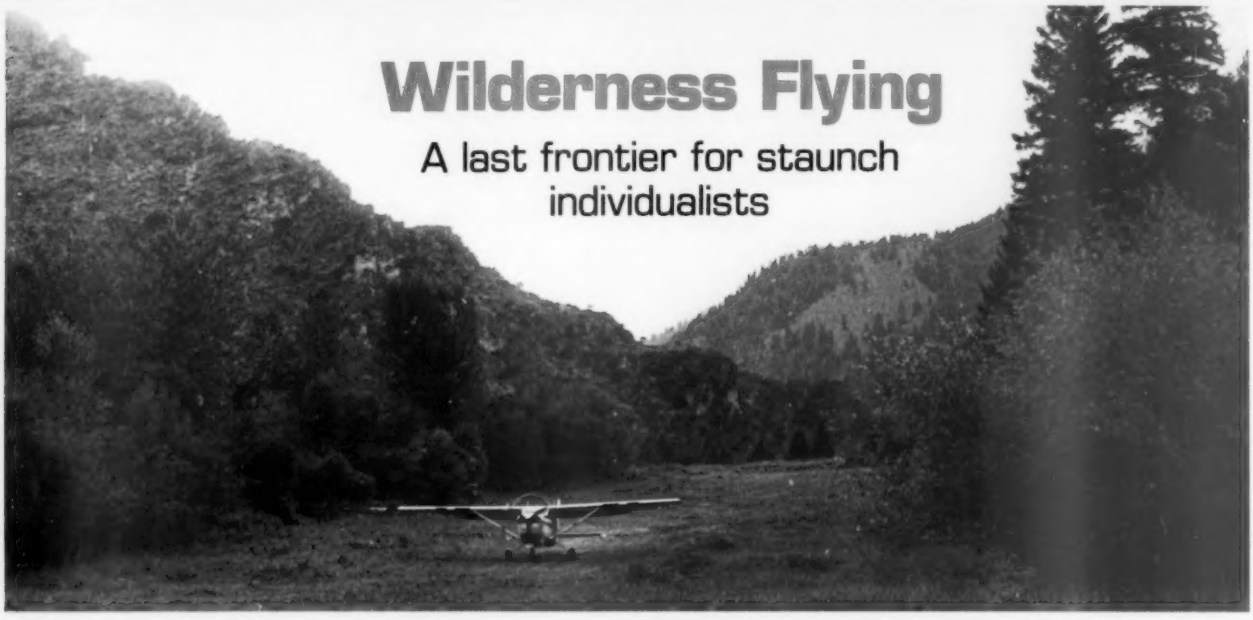
NON-FAA ACTS AND REGULATIONS AFFECTING LOW FLIGHT, OFF-AIRPORT LANDING

Regulation or Act	Areas Affected	Provisions	Maximum Penalties
Endangered Species Act (Enforced by Fish and Wildlife Service)	Anywhere	*Prohibits destroying or harming endangered species of birds, fish, animals or plants	$20,000 fine and/or one year imprisonment, aircraft seizure
Airborne Hunting Act (Enforced by Fish and Wildlife Service)	Anywhere	*Prohibits shooting from aircraft or using an aircraft to harass birds, fish or animals	$5,000 fine and/or one year imprisonment, aircraft seizure
Wilderness Act (Enforced by Forest Service)	National Forest Wilderness Areas	*Landing or airdrops prohibited 2,000 ft. AGL altitude requested	$500 fine and/or six months imprisonment
National Park Service Regulations (Department of Interior) Title 36, Code of Federal Regulations	National parks, monuments, seashores, lakeshores, recreation areas, scenic riverways	*Landing or airdrops prohibited 2,000 ft. AGL altitude requested	$500 fine and/or six months imprisonment
U.S. Fish and Wildlife Service Regulations (Department of Interior) Title 50, Code of Federal Regulations	National wildlife refuges, big game refuges, game ranges, wildlife ranges	*Landing or airdrops prohibited 2,000 ft. AGL altitude requested	$500 fine and/or six months imprisonment

NOTE: State regulations vary. Pilots should check with state aeronautical departments or other state agencies for details.

Certain areas, established by official action, are protected by specific flight restrictions. Example: Boundary Waters Canoe Area in northern Minnesota, created by Executive Order, where flight below 4,000 feet is prohibited. This type of area appears on charts as "Prohibited Area," outlined in blue, with restrictions noted on chart legend.

*Unless authorized by administering agency.



Wilderness Flying

A last frontier for staunch individualists

Sacajawea and her Indian friends warned Lewis and Clark, in 1805, that for their Expedition West the Salmon River was not navigable through the maze of heavily wooded, twisting mountain valleys of the Idaho territory. The called it the *River of No Return*, because, they said, if the boulders and the wild white water did not get you on the way down, there was surely no way you were going to move a boat upstream against the current. Lewis and Clark gave it a try, but after a half-day struggle the battered and doused Expedition gave up and moved nearly a hundred miles north into Montana before finding an easier passage to the Snake River, the Columbia, and eventually the Pacific. Today, nearly 180 years later, the River of No Return country is still pretty much of a wilderness, officially so described and protected by the Department of Agriculture, some 2¼ million acres surrounded by National Forest and Primitive Areas. There are no public roads, no telephone lines, and no improved airports—only meager strips in mountainous meadows, with usually a windsock and the wear of wheels in tall meadow grass.

The Indians are gone now, but the descendants of trappers, gold seekers, and homesteaders—plus a modern day sprinkling of vacation ranchers and their clients—make up an estimated population of 15,000 persons who have come to depend very heavily on small airplanes for supplies, mail, and transportation. Some have their own aircraft but most depend upon small operators in McCall and Cascade in the Payette River Valley, to the west; or from the towns of Stanley, Challis or Salmon along the North Fork, for their contact with the outside world.

This kind of bush flying, pretty much unique in the adjacent 48 states, is a throwback to an earlier period of aviation before radio navigation, radar and other electronic wonders made it possible to substitute automation for many of the primary skills of flying, and to depend more on information from panel instruments than from pilot observation, judgement, and deduction. Anyone who hankers for a refresher course in what it is like to fly by the feel of the airplane and by direct reference to the ground rather than by following charts or needles—should spend a few days flying with the pilots who service this Idaho National Wilderness Area.

They operate in all seasons, and all seasons have their problems. In autumn, as in late spring, the half-frozen, high meadowland strips tend to become rutted and treacherous under soggy snow. Decisions about using wheels or skis to land are critical, but at least air temperature and density altitude are of little concern.

In winter the air is often stable and the terrain is firm but the deep snows can mask stumps and fallen trees that sometimes find their way into the landing area. Snow also has a way of altering the appearance of the landscape, obliterating familiar turning points and immobilizing wind indicators. Sun glare on smooth snow can cause mistakes on approach, similar to the glare on mirror-still water. The weather sometimes isolates small communities for weeks, and there is nothing much you can do about it but wait for a break.

Summertime is the busiest season, but has the shortest flying days, usually from sun-up to about ten a.m. After that the temperature pushes the density altitude up too high to operate at any of the difficult strips with any kind of a payload.

There are several dozen airstrips in the Wilderness, most of them designated by the U.S. Forest Service for their ranger stations but they are open to transient pilots. Many of these have a "W" imprinted in a circle, on the Idaho state chart, as a warning to pilots that they should not be used without knowledge of the special techniques and procedures required. Private airports designated "R" for restricted are also likely to be beset by unreported hazards or seasonal difficulties. Runway lengths are as short as 1,100 feet, they are usually on sloping terrain, and "blind" approaches are common. "Facilities" are non-existent, except for what you bring in or nature provides.

The payload, of course, is what makes this kind of on-demand air service possible; it is not subsidized, although there are some Star route mail contracts. Otherwise the operators make out by hauling anything in sight, from people to mangoes to manure. The business is highly competitive and the rates are modest, usually about eight cents a pound for goods, and about a dollar a mile for passengers. No one gets rich, and no one expects to. You fly the River of No Return country for one reason: you love what you're doing. No day is exactly like another, and everyday is exciting, it challenges you for everything you've got.

If you fly out of the Payette Valley you may fly with Arnold Aviation, owned and operated by Ray and Carole Arnold. They provide an "on demand" service every day of the week, but Wednesday is the big day—the day the mail is delivered. As a matter of economy this is also "delivery day" for the dozens of orders for food, liquids, clothing, hardware and a wide miscellany of other items which residents (both permanent and temporary) of the back country have ordered during the past seven days, via radiophone.

They make a small charge for picking up the items in town. By Tuesday evening a mountain of supplies has been accumulated in the Arnold hangar. It all has to be weighed and sorted to conform with the weight and

balance requirements of the aircraft and the planned trip itinerary. For this trip, in early August, those of us who are going along as passengers assemble at the hangar at 6:00 a.m., where you find two Cessna 206's already being loaded. These are their "workhorses," with 300 hp turbo-charged engines for climb power, a STOLL wing modification for slow flight, and a 1,700 lb. payload.

One C-206 has had all the seats except the pilot's yanked out, to make room for freight and food, which includes large quantities of bread, cheese and beer. This is the lead plane, which also carries the mail; it will be flown by Ray Arnold. The second plane, also fully loaded, contains three passengers as well. Carole Arnold does much of the loading, as well as Ray and Carl Isaksen, pilot of the second plane.

The radiophone is busy with weather comments from stations and ranches in the Wilderness Area. Several stations report low morning fog, although here in the broad Payette Valley the day is dawning clear and bright.

We are off and flying at 6:15. Our pilot, Carl, is a young ex-ag flyer, trained in local mountain flying by Arnold. We climb over the first ridgeline of the Sawtooth Mountains at 10,000′ while talking on the radio to other aircraft, who report that the South Fork (of the Salmon River) is socked in "all the way," and sure enough, as we clear the ridge we see a solid mass of fog packed into the valleys every way we look. Isaksen heads north to see if Chamberlain, a U.S. Forest Service strip near the main course of the Salmon is open.

The tops of the ridges and peaks all look alike to me, but in response to my questions, as I study the chart, Carl calls out the name of a basin here, a valley there without hesitation. He does not yet know all of the territory like the back of his hand, as the veterans do, but he knows his own limitations, which is one reason why Arnold trusts him.

After an hour's flight Carl points to a mile-high basin tucked in with a blanket of clouds—"Chamberlain." He talks to the ranger station on the radio, learns they can see "a few holes in the clouds," and decides to make a slow pass over what he believes is the landing area. We see a few "pigeon holes" but mostly thick white stuff, and Carl tells them on the radio we'll be back later. We head east for Cold Meadow, on the Middle Fork.

Cold Meadow is even higher (6,780′) but Carl explains that there is more open terrain around the strip where the morning fog can dissipate sooner than elsewhere. The Idaho state aeronautical chart gives the (north/south) runway length as 4,600′, which seems like a lot, but Carl says that if you don't plan on using it all you may be making a big mistake.

We fly over several mountain meadows which all look pretty much alike and I wonder what distinguishes the area Carl identifies as Cold Meadow: there is no visible "runway," no markers, not even a shack nearby. (The ranger station is some distance away, in the shelter of the woods.) We land near a windblown sock and bounce along on hard ground obscured by tall grass. We stop after a landing roll of about 500 feet. The mail and supplies are for an itinerant logger, who strolls out to meet us in the meadow, wearing long boots and a broad-brimmed hat and accompanied by an ancient hound dog.

He is particularly grateful for a new supply of tobacco "fixins," as he rolls his own, and he stops to chat with Carl. A half an hour later they are still chatting. They have covered the weather, the logging industry, the economy, the state of his dog's health (poor), the prospects of an early winter (good, as usual), the game herds, the tourists, the forest service people, and some other subjects I didn't catch. Occasionally Carl interrupts himself to use the airplane radio and talk to an overflying airplane, and then he goes back to serious gossip. The other passengers and I grow restive, get out and stretch, stroll around and comment on the size of the woodchuck holes in the landing area (big enough to hide a small horse).

Finally the logger leaves. Carl comes over and tells me we should get moving pretty soon. The earlier pilot reports he got from Chamberlain said the valley still had fog in it, and since all of our remaining stops are along that stretch of the South Fork of the Salmon he figured we might as well sit tight where we are, instead of burning fuel looking for holes in the clouds.

I look at my watch again; it is now almost 9:00 a.m. Four hours since Carl started work, and all he had delivered is one postcard, some bacon and beans and a few ounces of tobacco. It looks to me that we are not likely to offload all of our goods by the time the noon day heat settles in, and Carl agrees: we might have to finish off on another day. I wonder about the economy of this type of operation, but I have to agree that run-

Early morning fog blankets valleys of Idaho Wilderness Area.

Bill Dorris, ex-WW I Marine pilot, operates McCall Air Taxi.

ning behind on a delivery schedule is of lesser concern than risking some broken bones or busting up a good airplane, which might have to be hauled out by helicopter. Patience, out here, is not merely a virtue; it is a necessity.

Carl says it is simply a question of survival. In this kind of flying the margin of error is usually too thin to allow for concerns about beer getting warm or meat going bad—or anything else that might distract you from being fully aware of where you are and what you are doing at all times. He mentions an accident that happened at a strip not far away, a few years ago, when an experienced pilot carrying five passengers to a mountain strip became concerned about a possible gear extension problem. An improper approach led to wingtip contact with the slope and a fatal crash for all occupants.

"The kind of places we fly into," Carl says, "you can't afford to think about anything but what you are doing right now."

Preparing to take off, he taxis all the way back to the head of the meadow. He knows the strip is listed at 4,600 feet, but he also knows that the absence of clear areas or level terrain at either end can reduce the available takeoff or landing roll by 10 to 20 percent. He knows too that in this season the tall grass will lengthen our ground run somewhat.

The mountain slopes beyond the departure end of the meadow do not look particularly steep, from the distance of almost a mile, but Carl knows from experience that this is rapidly rising terrain and he will have to start a turn very soon after liftoff, so he wants all the room he can get. With an 80 degrees outside air temperature, density altitude is a serious factor at this elevation. We are still nearly at maximum gross weight, and the ground is wet.

I add up all the numbers and it still seems as though we have runway to spare—until Carl mentions the downdraft you occasionally experience here on departure—"like stepping off a cliff." I ask about taking off in the opposite direction and says, Yes, there are times when he would do it, but not today, this late in the morning, with this much of a load.

We take off without incident and fly to Chamberlain, where the clouds are pretty well dispersed now, and land. Even before we touch down I see half a dozen men, mostly bearded and booted, hustling out of the woods toward the airplane, pushing a wheelbarrow. The bulk of our supplies are offloaded here. After checking with Ray via the Forest Service radiophone we continue on our route, which terminates at the Taylor Ranch along Big Creek, in a high mountain canyon.

The strip at Big Creek requires a dogleg or "blind" approach. We overfly it first to check on conditions at the strip, make our radio contact, and then approach upstream, banking with the bends in the river. Abruptly the small, narrow meadow comes in view and we level off and land with the stall warning horn blaring constantly. Touchdown is some 500 feet down the runway but the upslope grade and judicious braking bring us to a halt before we reach the tributary creek that rims the meadow.

Mail and delivery day at the Taylor Ranch on Big Creek, Idaho.

Researchers at Taylor Ranch also make weather observations.

Taylor Ranch, once a working homestead, is now operated by the University of Idaho as a research field station. A half dozen biologist and archeologists are currently in residence; most of the remaining supplies and the other two passengers are offloaded here. I too am asked to remain while Carl takes two of the scientists on an aerial survey or tracking mission. Electronic gear is fastened to the wing strut and radio receivers placed on board are used to locate the movements of a mountain lion, which had been previously fitted with a "bugged" collar (after being tranquilized with pellet guns).

On his return Carl stops the airplane at a level spot for an accurate fuel check. It is time to head directly home. The few undelivered supplies will have to wait for another day.

But we are not to go back empty. Two extremely rank and nervous hound dogs are outward bound with us, chained in the rear of the cabin. They protest the entire procedure by alternately howling, getting sick and relieving themselves. It is difficult to hear anything, and unpleasant to breathe. Carl, busy preparing for departure, seems unaffected.

We take off downhill, announcing our intentions on the radio and weaving our way over the river until we gain altitude and rise over the mountain. Carl sets a course without paying much attention to the chart.

On the way back he tells me about some of the "really difficult" strips he has been into, with usable runways of little more than 300 feet. He admits that you have to know what you are doing every inch of the way, and pick up the right time and conditions.

That pretty well sums up this kind of flying for me: being constantly, physically and mentally, alert—to where you are and what is happening to the airplane. Being able to handle mountain Wilderness Area strips safely can do wonders for your sense of flying competence, even if you normally fly sophisticated aircraft on IFR flight plans. But these are not skills to be learned on your own, on a weekend. "Re-learning" some of the forgotten techniques of early-day flying takes time and patience, *plus a good teacher*. It is not something you can learn out of a book, and it does not come cheap.

But some people think it is worth it. ■

Editor's note: Pilots interested in acquiring the skills needed for Wilderness Area flying should seek guidance from the local FAA Flight District Office, or from a local fixed base operator who gives special instruction. This article was prepared with the assistance of the Boise, ID, District Office and the FAA Accident Prevention Program, Northwest Mountain Region, Seattle. Note that there are restrictions concerning flight operations in National Wilderness Areas, and en route flight below 2,000 feet AGL is generally prohibited.

SEAPLANES TO CANADA

How to avoid getting mired in red tape if you bend some metal

Canada, with its super abundance of out-of-the-way lakes, ponds, rivers, and bays, has always been attractive to floatplane flyers from the United States who like the wide open spaces. Except for a few areas in central Canada it is hard to find a region which is not polka dotted with navigable bodies of water. Border-crossing procedures are simple, flight regulations are basically similar to ours, and the natives are friendly. What is more, the U.S. dollar goes about 20¢ farther north of our border, and helps with the fuel bill.

But what happens to the American pilot who blithely spreads his wings to the big Canadian skies—and unexpectedly finds himself in need of maintenance or repair work? What happens if after beginning a restful vacation, you snag a float on a hidden log in a lake in the middle of nowhere? You radio for help, the Mounties bring in a mechanic, you get fixed up, and go right back to your trout fishing, right?

It may not be that simple, friend. A damaged American aircraft in Canada is liable to receive considerably more attention from officialdom and lead to more paper shuffling than you imagined possible.

Specifically, U.S. FAR Part 43.17 addresses what Canadian mechanics can and cannot do to U.S. registered aircraft. Work on U.S. registered aircraft may be performed by a Transport Canada licensed "aircraft maintenance engineer" (AME) with the appropriate ratings or a person who is an authorized employee (approved inspector) of a company whose maintenance program has been approved by the Canadian Ministry of Transport. This includes maintenance, preventive maintenance, and alterations in a manner described in FAR Part 43.13 (Performance Rules). A person so qualified will also make the required maintenance record entries. Maintenance, preventive maintenance, and alterations may be approved—or certified—for return to service by a Canadian AME; however, he may not approve a *major repair* or *major alteration* done by Canadian mechanics for return to service. If the way in which the major repair or alteration has been accomplished is first approved by FAA, then a Canadian approved inspector may certify the return to service. This is usually accomplished by telephone and mail with the nearest FAA office and can take time.

Canadian offices can be very helpful in assisting you in obtaining a qualified person to do the repairs and in getting the necessary documents transmitted to the proper places, provided that you contact the appropriate office. The process may seem—and is—time-consuming to the pilot eager to get airborne again. If all else fails, you could contact the nearest (stateside) FAA flight standards office and ask for their guidance. The key is patience; bureaucracy can seldom be speeded up; and the rules are made for a good reason—to assure mutual safety.

Certain types of preventive maintenance inspections can also be performed in Canada with no problem as long as they are done within Part 43 and the proper log entries made. If the inspection is a 100-hour or a progressive inspection, a Canadian AME may perform it, again in accordance with FAR 43.15, and make the appropriate maintenance record entries. However, an *annual* inspection may be performed only by a U.S. mechanic with inspection authorization. So, if your aircraft is approaching annual inspection time, best have it done before you leave. If

Careful pre-landing surveillance is advised in Canada.

you have even a slight accident, and your airplane is discovered to be overdue on inspection, your woes will worsen.

What if the unavoidable happens? What if you spot a remote, likely looking fishing hole or idyllic lake where you would like to spend some time, and in the process of landing punch a hold in a float or crumple a wingtip? In Canada, what step-by-step procedure does an American follow to report the occurrence and obtain assistance?

The process is not that much different from what is required in the U.S., but for an American pilot with a damaged American aircraft in Canada, there is twice as much to do—two authorities to satisfy.

First, you must report any aircraft accident to the nearest Canadian flight service station or air traffic control unit. (Airworthiness inspectors are attached to these offices in Canada.) They will then notify and begin coordination with the nearest FAA office, which may or may not consider it necessary to send their own inspector along with the Canadian counterpart. Similar to our National Transportation Safety Board's definition, an accident in Canada is any occurrence which causes serious injury to a person or substantial damage to an aircraft. "Substantial damage" is determined by the degree of structural damage—best judged by a qualified mechanic. Do not consider flying even a slightly damaged airplane to the nearest airport. As with U.S. accident investigation procedures, the aircraft and the accident site must be left "as is" for the official investigator. Furthermore, even if you are a U.S. licensed A&P yourself, do not try a temporary fix without the proper Canadian authorization.

In the back country, radio contact may be your only manner of reporting an accident and requesting assistance. Your standard VHF radio should reach the Canadian communication network—unless you are down in a valley somewhere or deep in a sparsely settled country. FSS and other air traffic frequencies for your area will be listed in the Canadian facility publications—the VFR and IFR Supplements, the Northern Supplement, and the Water Aerodrome Supplement are essential. FSS frequencies are usually 122.2 and 126.7 MHz, and they and the air traffic control units monitor 121.5. But in an emergency, Canadian officials suggest a pilot use any available frequency (including 121.5) to report and request assistance.

If repeated attempts to raise authorities by radio fail and you are nowhere near a telephone, there is always the ELT. In remote areas, Canadian officials suggest you activate the ELT only when you hear an overflying aircraft (to preserve the battery); however, if serious injuries have occurred, then activate the ELT immediately and leave it on. Even if you have picked an area where it is likely no other aircraft will cross, your emergency signal is almost certain to be picked up by one of the three satellites now in orbit and equipped to relay information to search and rescue organizations. Any required rescue effort will be hastened if you filed a flight plan. In any case, an additional safeguard would be to let someone in "civilization" know where you are going to be and when you plan to return and have them contact authorities if you are overdue.

Once you have reported your mishap, called in the authorities, and given your report, unless you need to be moved for medical attention, you must simply wait for the arrival of Transport Canada officials. After their inspection they may decide to bring an AME to the site to determine if the aircraft can be flown out safely or will have to be otherwise removed. If the former is the case, a ferry permit will be issued, and the aircraft can be flown to the nearest repair base in Canada. However, if the AME feels the damage is too extensive for a ferry permit, prepare yourself for the expense of having it trucked out or—if you are really away from it all—having it airlifted out. If the aircraft is ferryable, and you wish to have the work done at your home base, you must also apply for a U.S. ferry permit (from FAA) before you may cross the border.

If Canadian repair is your choice, rest assured the work can be done competently by a Canadian maintenance engineer; it is the "red tape" that may bog you down. The appropriate FAA and Canadian offices will have to coordinate certain details, and that process, although routine, takes time—valuable time that you could have spent enjoying yourself or getting back to your job while you still have one.

The situation can be compounded if you find yourself in the middle of enforcement procedures as well, either from safety rule transgressions, or as a result of landing on unauthorized bodies of water. Although most of Canada's thousands upon thousands of lakes are freely open to visiting seaplane pilots, there are certain restrictions governing the use of bodies of water in national and provincial parks, as well as operations in harbours or in "Vessel Traffic Management Zones."

All in all, an accident abroad, however minor, is going to cost you a lot more in time and money that you probably imagined possible in such a friendly country. So, it is best to (1) be extra cautious about exercising all the proper flight safety measures when you cross the border, to prevent an accident in the first place; and (2) to spend a little before-travel time in assembling pertinent Transport Canada literature and familiarizing yourself with their procedures and rules.

The American saying "An ounce of prevention is worth a pound of cure," has its counterpart among the French Canadians: "Vous qui croyez que la sécurité coûte cher, essayez un accident!" (If you think safety is too costly, try an accident!) ■

(This article was prepared with the assistance of Transport Canada's Atlantic Region; the FAA Portland, ME, GADO, New England Region; and the Seaplane Pilots Association—421 Aviation Way, Frederick, MD, 21707; 301-695-2083.)

HELPFUL PUBLICATIONS

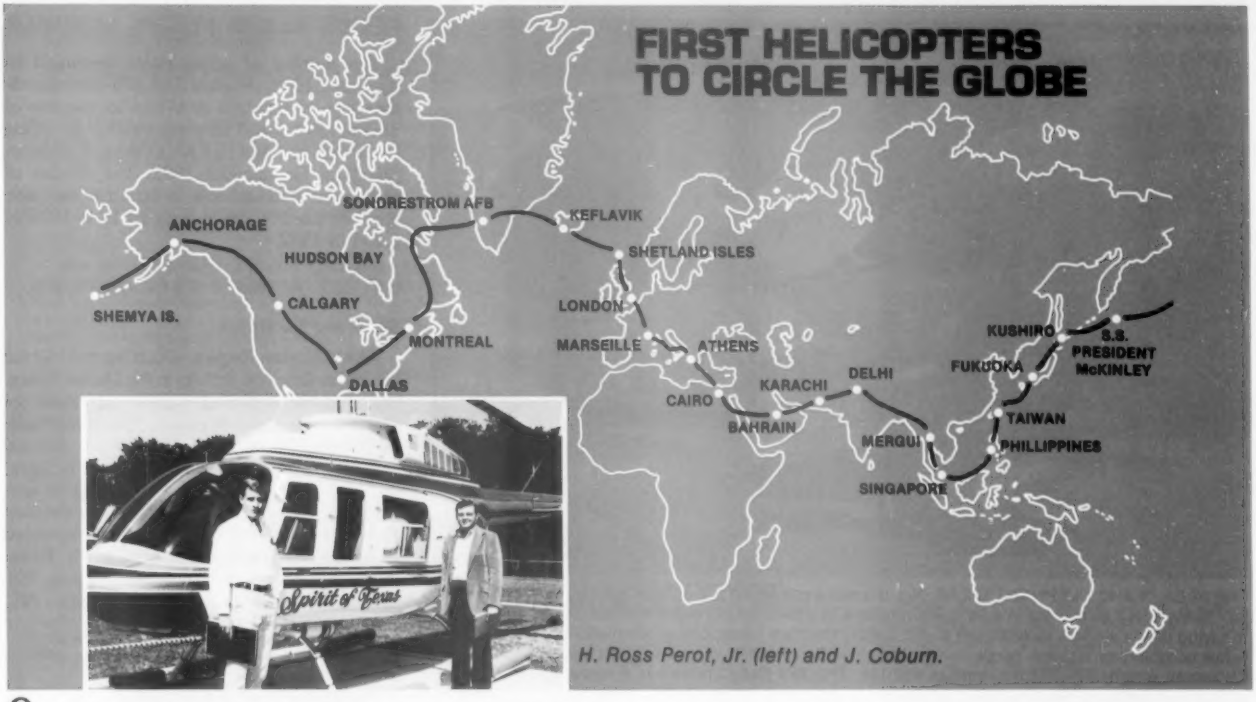
VFR Supplement (annual subscription)	$17.50
(single copy)	$10.50
Water Aerodrome Supplement (single)	$5.00
(annual subscription)	$10.50
IFR Supplement (annual subscription)	$24.00
(single copy)	$6.50

Prices, given in U.S. currency, are subject to change. Order from:
Canada Map Office
615 Booth Street
Ottawa, Ontario, Canada K1A 0E9
Add a $2.00 service and handling charge per order if purchasing only single copies. Make checks or money orders payable to the Receiver General for Canada.

Useful information for U.S. pilots flying to lakes in restricted flight areas is found in Canadian Air Navigation Order V, No. 10, "Flight Restrictions, National, Provincial, and Municipal Parks Order." It is available from any Transport Canada office or contained in the Canadian Aeronautical Information Publication, counterpart of AIM. The price is $18.30 for the basic manual or $36.60 for a year's subscription and amendments. Sold by Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Ontario, Canada, K1A 059.

See also FAA Advisory Circular 43-10A, "Mechanical Work Performed on U.S. and Canadian Registered Aircraft." Free from the DOT Publications Branch, M-442.32, Washington, DC, 20590.

For an update on the latest Canadian operational and air traffic procedures for all types of aircraft, see the May/June 1983 issue or subsequent reprint of "Alaskan Adventure," free from FAA District Offices.



H. Ross Perot, Jr. (left) and J. Coburn.

On August 6, 1982, an article appeared in a Dallas newspaper about Dick Smith, an Australian businessman who had just flown out of Texas on what was planned to be the first trip around the world in a helicopter. As Smith was aware of no one else making the attempt, he felt no need to hurry and planned to stop over at various capital cities.

On this point he was wrong. A young Dallas citizen concluded, after reading the article, if U.S. technological achievements made such a flight possible then U.S. pilots should be showing the world how it could be done. With this in mind the 23 year old son of Texas multi-millionaire and philanthropist, H. Ross Perot, Sr., decided to seek his father's financial backing for the project.

However, Ross Perot, Jr., knew his father would not be easily convinced that the flight could be organized in time to finish ahead of the departed Australian. For five days, he and J. Coburn, a friend and former Vietnam helicopter pilot, researched weather, route, and equipment requirements furiously. On August 12, 1982, when all their facts and figures were gathered, they presented a plan for overtaking the Aussie less than halfway around the world. Papa agreed to back them provided they departed no later than September 1—20 days off.

There was no time to waste. The next morning they placed their order for a $725,000 helicopter and took delivery off the Dallas assembly line that afternoon.

Their choice was a Bell *Long Ranger II*, seven-place, light utility helicopter with a 500 hp turbine engine and a gross weight of 4,150 lbs. In addition to the big engine, other special features assured better performance in wide range of environments, from dusty to damp. An integral particle separator removed water and impurities from the engine air intake, reducing the possibility of flameouts from water, or excessive wear from abrasive desert sand.

Necessary modifications and additions to the "Spirit of Texas" for this flight included: stripping off all unessential weight; adding high visibility colors; installing auxiliary fuel tanks in the cabin, a pop-out float kit (for water landing), special cockpit heating, and long range communication and navigation equipment.

Furthermore, both pilots needed refresher courses on instrument flying, as well as long range navigation schooling and inflight training, plus training in emergency procedures.

By August 22 everything was beginning to come together. The only major problem seemed to be a proper support, or "chase" plane. It would have to be large enough to carry a maintenance team of six specialists, plus crew; replacement components for the *Long Ranger*, special food and water in case they became stranded; pods for air refueling; very detailed maps covering the entire route; survival gear for the various terrains; and a mountain of official documents, permits, passports and visas.

The ideal choice was the four engine military C-130 *Hercules*, but leasing one from somewhere and finding a crew qualified to fly it was not easy. However, with Perot, Sr.'s influence the plane and aircrew were found. During the trip this "Mother Hen" would have to fly in an S-track to accommodate its cruising speed of 368 mph to the 125 mph of the "Texas."

Right on schedule, "The Spirit of Texas" was winging its way towards Montreal from Dallas just as first light was breaking on September 1. En route weather was poor, but Perot and Coburn managed to stay VFR at low altitudes— ". . . actually flew under bridges and powerlines and used buoys for navigation . . ." Coburn noted in the Montreal segment of their daily log. Other selected log entries:

9/3—**Hudson Bay, Canada:** ". . . landed at Eskimo village . . . no English spoken here but . . . had two barrels of jet fuel."

9/4—**Greenland:** Left Sondestrom Air Force Base ". . . decided to set down on ice cap and walk around just to see what the terrain felt like."

9/5—**Keflavik, Iceland:** "Flown 47½ hours in five days. Combined with being in the rubber (water survival) suits for most of that and the tension of all the water crossings, the fatigue was showing."

9/6—**Scotland:** Weather got worse ". . . flew the tree tops thru (sic) hills . . . chased the sheep through the meadows . . ."

9/7—**London:** At Farnborough Air Show ". . . avoided a press conference with Dick Smith. (They had overtaken their competitor in England.)

9/10—**Egypt:** "What a contrast as now we face the many days of heat and desert terrain. Flight path . . . took us near Pyramids."

9/13—**Pakistan:** Problems with flight planning, Pakistanis wanted "Texas" to use a route to Delhi from Karachi longer than they had fuel to

(Continued on back page)

THE FLEA IN THE ELEPHANT'S EAR. No, it's not a miniature toy or trick photography. The Stits *Sky Baby*, billed as the world's smallest airplane, is a certificated experimental, shown here under the wing of the world's largest, the C-5A *Galaxy* (military transport) at Mitchell Field, Milwaukee. A few comparison figures, respectively: Length—*Galaxy* 248′ versus 10′; wing span 223′ versus 7′; empty weight 337,937 lbs. versus 452 lbs. The *Sky Baby* cruises at a remarkable 165 mph.

MORE CESSNAS ELIGIBLE FOR AUTOGAS CERTIFICATION

Owners of Cessna models 120, 140, 180, and 182 may be eligible to use automotive gas in their aircraft under Supplemental Type certificates issued recently to the Experimental Aircraft Association. Similar to the STC issued for Cessna 150 aircraft last year, the new STC's must be purchased from EAA.

EAA test pilots flew a standard Cessna 182 for 530 hours on automotive gas (ASTM Specification D-439, 87 or higher anti-knock index) without incident over a three-month period. The STC's were issued by FAA's Central Region on the basis of the test data, which indicated no signs of engine or performance deterioration attributable to the fuel.

Owners of Cessna Models 120, 140, and 140A aircraft with Continental engines of 100 hp or less may purchase the STC for $42.50 if members of EAA; for $57.50 if not. Cessna Models 180 and 180A-J owners must pay $112.50 (members) or $127.50. The costs for members and non-members respectively for the Models 182-C182P are $115 and $130. Models 180, 180A-J, and 182-C182P must have Continental engines *in the 0470 series* to be eligible.

As with the Cessna 150 STC, additional information and mandatory changes to the aircraft flight manual will be included. Also, as with the 150 STC, placards indicating the exact type of auto fuel to use must be installed, and the same precautions must be observed about abrupt opening of the throttle after idling and the anticipation of carburetor icing somewhat sooner than with avgas.

For further details, write EAA Auto Fuel STC's, P. O. Box 229, Hales Corner, WI, 53130.

ILS REPLACEMENTS SCHEDULED

FAA has begun replacing out-dated vacuum tube components in instrument landing systems with new, more reliable solid-state equipment at 189 small and medium airports, starting in January of 1984. The project should be completed by late 1985, and will ensure a high standard of operational service for the next 10 years, during which period they will co-function with newly installed microwave landing systems.

Solid state circuitry should improve the availability of ILS signals by decreasing outage time. The first 25 airports scheduled for delivery of the new equipment are:

Montgomery, AL	Greensboro, NC
Ft. Smith, AR	Binghampton, NY
Oxnard, CA	White Plains, NY
Van Nuys, CA	Youngston, OH
Visalia, CA	Wiley Post, OK
Colorado Springs, CO	Reading, PA
Pueblo, CO	Sioux Falls, SD
Miami (DC), FL	Austin, TX
Lexington, KY	Dallas (LF), TX
Norwood, MA	Lynchburg, VA
Portland, ME	Janesville, WI
Escanaba, MI	Jackson, WY
Jackson, MI	

IFR pilots using the airports scheduled for the new equipment should check NOTAMs carefully beforehand, in the event that the replacement procedure interrupts ILS service temporarily.

FEWER PILOTS, FLIGHT SCHOOLS

The number of active pilots continued to decline in 1982, down to 733,255 from the all-time high of 827,000 in 1980, but the rate of decline has tapered off considerably, according to statistics released by FAA's Office of Aviation Standards for calendar 1982. The number of certificated pilot schools in business has also dropped steadily, down from 1,617 in 1978 to 1,291 in 1982.

LATEST AIRMAN PUBLICATIONS

Seaplane Facilities

FAA's Alaskan Region, which has the highest per capita seaplane activity in the United States, has available a *limited* number of copies of a new free guidebook called, "Seaplane Facilities." The 75-page book provides general guidance on site selection, shore facilities, operational considerations, and designs for seaplane bases, with references for more detailed assistance. Seaplane operators from anywhere in the U.S. may write for a copy to Mr. Robie Strickland, AAL-600, FAA Alaska Region, 701 C Street, P.O. Box 14, Anchorage, AK, 99513.

Aircraft Census

The current issue of the "Census of U.S. Civil Aircraft—Calendar Year 1982" is now available. The census includes an inventory of registered aircraft by manufacturer and model. General aviation aircraft are listed by state and county of their owners. The air carrier aircraft fleet is presented in tabular form. Contact the National Technical Information Service, Springfield, VA, 22151, for purchasing information.

AUTOMATED WEATHER SERVICES

Automated Weather Observing Systems (AWOS) are now installed on a test basis at 14 airports in the continental U.S. (instead of the 21 originally plannned). A continuously updated report is available over the following telephone numbers or VHF frequencies:

Airport	*Telephone*	*Frequency*
Auburn, AL	205-821-4932	120.3
Bremerton, WA	206-674-2196	121.2
Dubuque, IA	319-557-1933	118.15
Galena, AK	907-656-1654	114.8
Houghton, MI	906-482-2529	112.8
Houma, LA	504-879-4205	112.0
Houston, TX	713-643-2166	117.6
Keene, NH	603-357-0410	109.4
Muncie, IN	317-284-0263	114.4
Wash. Nat'l, DC	703-486-3990	128.8
Palm Springs, CA	619-323-7167	115.5
San Luis Obispo, CA	805-549-9530	120.65
Santa Fe, NM	505-473-2125	110.6
Valdez, AK	907-835-2947	118.8

Pilots are invited to listen to these reports and offer comments to local FAA facilities or fixed base operators. Self-mailer questionnaires will be available.

• Chateau Ville d'Ashe

The pilot of the Piper twin shown on p. 16 of the May/June issue appears to have made the journey across the Atlantic using some dubious dead reckoning. He may think he is sightseeing over England, but the chateau visible below him is unmistakably French, probably in the Loire Valley.

Alan Lea
Longueuil, Canada

. . . that castle your ***Seneca*** *pilot is sightseeing after "Hopping Over the Pond" happens to be the Schloss Züzeinergraut in the Rhineland near Koblenz, where I was stationed in 1952. I hope his fuel estimates are more accurate than your caption writing.*

Lt. Col. (Ret.) John Morris
Saratoga, FL

. . . a castle in Spain is what your pond-hopping pilot is seeing (May/June 1983), certainly not an English estate. In fact it could be the Villa D'Este in Italy, but I'm not quite sure; I was there back in '48.

Andrew Byers
Leesburg, MD

. . . on p. 16 of the May/June issue is a picture of a "castle" in England, so you say. This castle, however, looks suspiciously like the Vanderbilt mansion called Biltmore in Asheville, NC. Well?

Douglas Harding
Orlando, FL

We never said anything about castles, did we? Okay, it's Asheville.

• Overflying MTR's

I would like to add a few additional comments concerning "Occupied Air" (January/February 1983 issue). Your article was excellent. Heeding the information in it will result in safer airspace for all users. For those interested, I offer my own personal views on dealing with MTR's.

First, AVOID them if at all possible. Second, if this is not possible, then overfly four-digit routes at an altitude in excess of 1,500' AGL. Third, overfly three-digit routes only after you have familiarized yourself with the route's altitude restrictions with information from your FSS, local military base operations, or a copy of the military "FLIP" handbook on MTR's (available at each military base operations facility). Even with the above rules, "See and Avoid" is still an absolute necessity.

Warren B. Hendrickson
Tucson, AZ

Amen.

• What are My Chances?

You put out a really good magazine. I have been subscribing for a number of years and like it very much. Keep up the good work.

Now for my question. I would like an explanation of the following terms used in area forecasts for describing thunderstorms: ***chance, slight chance,*** *and* ***occasional.*** *Which term means the phenomenon is most or least likely to occur? I have asked at several different flight service stations and no one seems to know. Can you tell me?*

Bucky Brigman
Lynn Haven, FL

In an area forecast, the terms "occasional" or "occasionally" are used to describe clouds and obstructions to visibility which are expected to occur with a greater than 50% probability, but for less than half of the forecast period, or for a prescribed time during the forecast period.

"Slight chance" (indicating a 10-20% probability) and "chance" (indicating a 30-50% probability) are used only to predict thunderstorms, precipitation, and related weather. Area coverage of thunderstorms and precipitation will be described using the following terms:

Isolated—single storm cells
Widely Scattered—less than 25% of area affected
Scattered—25% to 54% of area affected
Numerous—more than 54% of area affected

• Cross-Country Definitions

In your July/August 1983 "Forum" you make reference to the distance constituting a cross-country flight as being undefined. Check FAR 61.93 and you will see it is any flight over 25 nautical miles.

John Arwn
Danville, VA

FAR Part 61.93(a) refers to student pilots only, who can log trips of 25 NMi or less as cross-country but cannot apply it toward the private certificate. Part 61.109 specifies those distances precisely.

FAA GENERAL AVIATION NEWS welcomes comments from our readers. No anonymous letters will be used, but names will be withheld on request. Address: FAA GENERAL AVIATION NEWS, AFO-807, Washington, D.C. 20591.

• Written Tests & New Regs

I see that FAR 91.17(3)(i)(ii) regarding the towing of gliders has been changed from last year. When it comes to taking the private-through-CFI written glider tests, which reference is the FAA going to accept to determine the correct answer?

Shawn Knickerbocker
Spring, TX

The test booklet you use for your test is coded, so that the evaluator knows just what information was provided you in the current written test guide. In other words, you will not be penalized for rule changes that have not had time to appear in the guides.

• Multi-Engine Endorsement

Please review your answer to the question on multi-engine PIC in the May/June 1983 "Forum." I do not believe a flight instructor can endorse the logbook of a single engine pilot to fly multi-engine PIC. Doesn't this require an endorsement on the pilot certificate by an authorized examiner?

Billy Sanders
Shreveport, LA

With an appropriate endorsement from a flight instructor, a single-engine rated pilot may fly a multi-engine aircraft solo (with no other occupants). Successful completion of a multi-engine flight test and endorsement by an FAA inspector or pilot examiner is required before the pilot can carry passengers.

INSTRUMENT CORNER

• Standby Squawks?

I recently attended a flight instructor clinic and this issue was raised by a controller: when switching squawk codes on the transponder, pilots do not switch first to the "Standby" mode, so as not to interfere with other assigned squawks or emergency codes. Some of the flight instructors agreed this was a common problem, but others said they had never heard of this procedure. Is this some new standard operating procedure for IFR flying?

Robert C. Cline
Wharton, TX

Paragraph 170.a.3 states in part that ". . . transponder should be adjusted to the 'on' or normal as late as practicable prior to take-off and to 'off' or 'standby' as soon as practicable after completing landing roll unless the change to 'standby' has been accomplished previously at the request of ATC. IN ALL CASES, WHETHER VFR OR IFR, THE TRANSPONDER SHOULD BE OPERATING WHILE AIRBORNE UNLESS OTHERWISE REQUESTED BY ATC." "Operating" in this context means in the "On" mode.

There is no new standard operating procedure requiring pilots to switch to "standby" when changing transponder codes. Actually, pilots of airborne aircraft should **never** switch to "standby" unless instructed to do so by ATC. Since a transponder in the "standby" mode is not replying to signals from ground-based interrogation, switching to "standby" would have the same effect on ATC radar displays as turning the transponder off. Additionally there is the possibility that pilots could forget to switch back to the "on" position.

To avoid interfering with designated emergency codes when switching squawks, Paragraph 170.e.1 provides the following procedure: "When making routine code changes, pilots should avoid inadvertent selection of codes 7500, 7600, or 7700, thereby causing momentary false alarms . . . For example, when switching from code 2700 to 7200, switch first to 2200 then to 7200, NOT to 7700 and then 7200. This procedure applies to non-discrete code 7500 and all discrete codes in the 7600 and 7700 series . . . which will trigger special indicators in . . . facilities."

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FAMOUS FLIGHTS *(Continued from page 13)*

cover. ". . . finally in frustration agreed to the long route, knowing full well we would have to deviate after departure. We did deviate . . . and had to write a formal apology to the Indian Air Force on arrival at Delhi."

9/20—**The Phillippines:** "Departed early . . . and we headed out into Typhoon Ken . . . 50 knot headwind . . . makes it very slow going but managed to get around."

9/21—**Taiwan:** "After landing received word . . . Russians will definitely not let us land," so on to Japan.

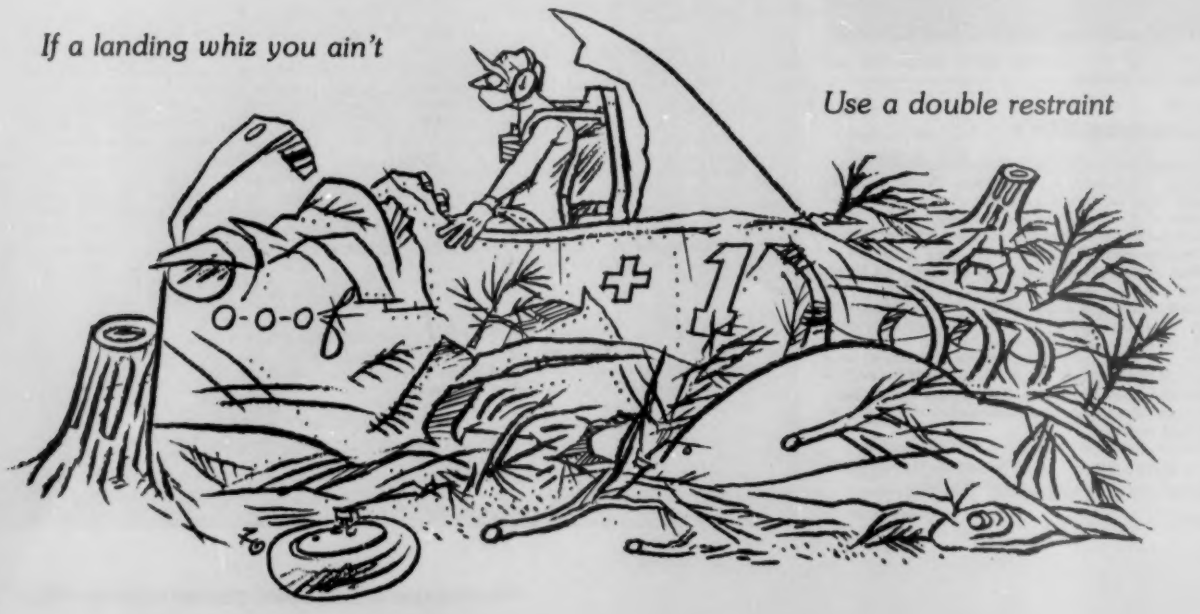
Without access to the Siberian penninsula from Japan, they were still over 1,500 miles from the nearest landfall in North America—and their maximum range was 800 miles. Anticipating this problem, Perot, Sr., had helped them arrange for a midpoint "carrier" landing, on a jury-rigged pad on the foredeck of a trans-Pacific freighter, where refueling would take place.

On September 26 the "Texas," accompanied by her KC-130 "Mother Hen," set out for the ocean rendezvous. Adverse winds ate up the fuel reserves of the helicopter and the KC-130 (which would have to proceed to the Aleutians with refueling). If the chopper had to ditch, they could not count on aerial assistance from "Mother." The big transport, flying at near ceiling altitudes, was able to spot the freighter and direct the "Texas" to the rendezvous before hightailing it to Alaska.

Despite 12 foot waves and a 35 knot wind, a successful landing was made on the freighter with 30 minutes of fuel remaining. After a layover, "Texas" took off for the 7½ hour flight to the Aleutians. By this time bad weather was again catching up with them, slowing the flight down with headwinds. Nightfall was descending and they were all alone on the stormy north Pacific, but the U.S. Navy radioed assurance: a destroyer and an aircraft carrier were standing by. By great good luck they made a night landing on shore with 15 minutes of fuel remaining.

After a stop in Anchorage, they followed the Alcan Highway over Canada to Calgary, Alberta, and by stopping only to catnap in pilot lounges, managed to arrive in Dallas on the last day of September.

The trip had taken 29 days, 3 hours and 8 minutes, covering roughly 25,000 nautical miles, crossing 26 countries and 17 seas and oceans, burning 8,517 gallons of fuel in the 246.5 hours of flight time. The overall cost was slightly enormous, but Ross Jr. said only, "the cost is irrelevant to the project . . . I did it for the satisfaction."

Probably that satisfaction came as much from having successfully endured 29 days of confined stress without giving up the project, as it did from proving that with meticulous care you can do anything in a helicopter that you can do in any other aircraft—and some things better. Also satisfying were the Awards—for "Extraordinary Service to Aviation" from FAA' and for officially completing the first helicopter around the world, from the International Aeronautic Federation.

P.S. Dick Smith also arrived back in Dallas after circling the world . . . 10½ months later. ■